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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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EXAMINER

BATAILLE, P

ART UNIT

PAPER NUMBER

2186

DATE MAILED:

01/19/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

# Office Action Summary

Application No.  
09/394,564

Applicant(s)

Howard T Olnowich

Examiner

P. Batalle

Group Art Unit  
2186

☒ Responsive to communication(s) filed on Sep 10, 1999

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

## Disposition of Claim

- ☒ Claim(s) 1 and 31-39 is/are pending in the application.
- Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- ☒ Claim(s) 1 and 31-39 is/are rejected.
- ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- ☐ Claims \_\_\_\_\_ are subject to restriction or election requirement.

## Application Papers

- ☒ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.
- ☒ The drawing(s) filed on Sep 10, 1999 is/are objected to by the Examiner.
- ☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.
- ☐ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119

- ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- ☐ All ☐ Some\* ☒ None of the CERTIFIED copies of the priority documents have been
- ☐ received.
- ☐ received in Application No. (Series Code/Serial Number) \_\_\_\_\_.
- ☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\*Certified copies not received: \_\_\_\_\_

- ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

## Attachment(s)

- ☒ Notice of References Cited, PTO-892
- ☒ Information Disclosure Statement(s), PTO-1449, Paper No(s) 3
- ☐ Interview Summary, PTO-413
- ☒ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Notice of Informal Patent Application, PTO-152

— SEE OFFICE ACTION ON THE FOLLOWING PAGES —

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## DETAILED ACTION

### *Information Disclosure Statement*

1. The information disclosure statement submitted on September 19, 1999 was filed in the application in paper No. 3. The submission is in partly compliance with the provisions of 37 CFR 1.97. Accordingly, all US Patent references noted on the information disclosure statement form (1449) has been considered by the examiner. However, Rule 37 CFR 1.97 requires that a copy of all references be provided with the form. Therefore, all non-patent references are not being considered until a copy of the reference is provided.

### *Drawings*

2. This application has been filed with informal drawings which are acceptable for examination purposes only. Formal drawings will be required when the application is allowed.
3. The drawings are objected to because of the problems addressed in the PTO Form 948. Correction is required.

### *Response to Amendment*

4. This Office Action is in response to applicant's preliminary amendment filed September 10, 1999. The applicant's remarks and amendment the claims were considered with the results that follow.

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5. Claims 1-30 were previously presented in the application for examination. Applicant's amendment canceled claims 2-30, and added new claims 31-39. Therefore, claims 1, 31-39 remain pending in the application.

6. The amendment filed September 10, 1999 has not fully been entered, because the amendment requests correction on page 1, line 2. The Text to be replaced is not included on the noted page or line.

*Specification*

7. The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

8. The specification is objected to because of the following informalities: the specification should be amended to reflect the status of noted copending or divisional application. Appropriate correction is required.

*Claim Rejections - 35 U.S.C. § 112*

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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10. Claim 37 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claim recites the limitation, "for accessing said memory word selectively from a cache line in said memory or from a remote memory". It is not clear what leads to this feature or how this features is related to the rest of the claim. Clarification or respectfully requested.

Claim 38 recites the limitation "said memory controller further" . There is insufficient antecedent basis for this limitation in the claim.

Claim 39 recites the limitation "said memory controller further" . There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 U.S.C. § 102***

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

12. Claims 1, 31, 35-37, and 39 rejected under 35 U.S.C. 102(b) as being anticipated by Gupta et al. (US5,535,116).

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As per claims 1, 31-34, Gupta teaches a directory-based cache coherency protocol system for a shared memory parallel processing system including a plurality of nodes [Col. 2, Line 64 to Col. 3, Line 4], a shared-memory computer system is forming a plurality of tightly-coupled processing nodes, each processing node having a data processor for executing software instructions, a main memory cache caching global shared data, a processor cache disposed between the data processor and the main memory cache, and a directory memory containing directory information for each data item assigned to the processing node [Col. 3, Lines 14-26], the directory-based cache coherency protocol system and/or shared-memory computer system further comprising:

a multi-stage communication network [general interconnection network 100, Fig. 1 & 2] for interconnecting said plurality of processing nodes [1a-1n, Fig. 2; Col. 3, Lines 10-12];

each said processing node including a one or more caches for storing a plurality of cache lines [22a-22n, Fig. 2; Col. 3, Lines 13-22; Col. 5, Lines 49-57; Col. 6, Lines 6-43];

a cache coherency directory which is distributed to each of said nodes for tracking which of said nodes have copies of each cache line [Col. 3, Lines 4-10, Lines 22-34; Col. 5, Lines 16-33; Col. 7, Lines 7-14].

As per claim 35, Gupta teaches maintaining a shared memory including a first memory portion for storing unchangeable data and a secondary portion for storing changeable data [exclusive data partition and shared data partition, Col. 10, Lines 7-32]; and said cache coherency

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directory listing which nodes of said plurality of processing nodes have accessed copies of said cache lines in said second memory portion [Col. 5, Lines 16-33; Col. 7, Lines 7-14].

As per claims 36, Gupta teaches the system wherein said plurality of nodes being operable for reading, storing, and invalidating said shared memory at any other said processing node [Col. 8, Lines 55-67].

*Claim Rejections - 35 U.S.C. § 103*

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. Claims 37-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gupta et al. (US5,535,116) in view of Hagersten et al. (US5,887,138).

As per claim 37, Gupta teaches maintaining data allocation and movement between the processing nodes done explicitly via software written by application programmer or automatically by the operating system [Col.5, Lines 35-43] at a first node a request for access to a memory word for first accessing the cache at said first node and accessing said memory word selectively from a cache line in said memory or a remote memory and storing said cache line to

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said cache at said first node [Col. 10, Line 45 to Col. 11, Line 37], but fails to specifically teaches a controller configured to access the cache or the memory or the remote memory. However, such feature is certainly inherent in Gupta's system since the functions are illustrated. In the alternative, Hagersten teaches a distributed shared memory architecture including a plurality of processing nodes within are residing processors and distributed shared memory system, the plurality of nodes communicating via a network coupled there between, and including directories used to identify which nodes have cached copies of data corresponding to a particular address [abstract; Col. 5, Lines 2-25], each node including corresponding caches and controller and said directory structure to provide control structure between the cache and the processing nodes and performing the transactions providing access to cache and the remote memories [Col. 11, Lines 6-32]. Therefore it would have been obvious to one having the teaching of Gupta and Hagersten before him at the time of the invention, to combine the control function of the controller as taught by Hagersten with the system taught by Gupta, the result would have provided memory management implemented through hardware, releasing the processor from executing the program software maintaining data allocation and movement, but to perform other functions.

As per claim 38, the features limiting the invention would have been obvious to any person having ordinary skill in the art because it is known in the art of a number of cache algorithms (most recently used, least recently used, and/or first-in-first-out, etc) providing cache replacement protocol, Gupta teaches the invention specifying that data may be displaced in the form of



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replacement when space needs to be allocated to service memory requests [Col. 7, Lines 32-34], a home node initiates replacement of a shared line by simply discards the line and informs the home node to to remove the initiating director from the sharing list [Col. 16, Lines 10-24].

As per claim 39, Gupta teaches the system comprising controller operable to send cache update messages updating corresponding cache lines of a changed cache line and for receiving cache line of data from remote nodes for updating the cache [Col. 15, Line 64 to Col. 16, Line 7].

### *Conclusion*

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US Patent No.	5,933,849	Srblic et al.	Aug. 3, 1999
US Patent No.	5,900,015	Herger et al.	May 4, 1999
US patent No.	5,887,146	Baxter et al.	Mar. 23, 1999

### *Contact Information*

16. Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

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(703) 308-9051 (for formal communications intended for entry)

Or:

(703) 305-9731 (for informal or draft communications,  
please label "PROPOSED" or "DRAFT");

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal  
Drive, Arlington. VA., Sixth Floor (Receptionist).

Any inquiry concerning this communication or earlier communications from the examiner  
should be directed to Pierre-Michel Bataille whose telephone number is (703) 308-5834. The  
examiner can normally be reached on Mondays to Thursdays from 8:00 P.M. to 5:30 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor,  
Matthew M. Kim, can be reached on (703) 305-3821. The fax phone number for this Group is  
(703) 308-9731.

Any inquiry of a general nature or relating to the status of this application or proceeding  
should be directed to the Group receptionist whose telephone number is (703) 305-3900.

P. Bataille

January 12, 2001

  
MATTHEW KIM  
SUPERVISORY PATENT EXAMINER  
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